



First Steps in Mathematics

Number

Diagnostic Tasks – Student Worksheets

Understand Whole and Decimal Numbers
Understand Operations
Calculate

First Steps in Mathematics Number

Diagnostic Tasks – Student Worksheets

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Classroom Planner for Week _____ Term _____ Year Level _____ Date _____

Key Understanding	Mathematical Focus	Activities	Focus Questions	Observations



Up To And Over 100

Name _____ Year/Grade _____ Date _____

Write the numbers to the end of the boxes.

Begin with one and count by ones to the end of the boxes.

1	2	3							



Up To And Through The Hundreds

Name _____ Year/Grade _____ Date _____

Write the numbers to the end of the boxes.

Begin at 91 and count by ones to the end of the boxes.

91	92	93							

Write the numbers to the end of the boxes.

Begin at 491 and count by ones to the end of the boxes.

491	492	493							

Counting Principles

Video Bronwyn

Principles of Counting	Knows	Needs to learn
<ul style="list-style-type: none"> Each object to be counted must be touched or 'included' exactly once as the numbers are said. The numbers must be said once and always in the conventional order. The objects can be touched in any order and the starting point and order in which the objects are counted doesn't affect how many there are. The arrangement of the objects doesn't affect how many there are. The last number said tells 'how many' in the whole collection, it does not describe the last object touched. 		

Diagnostic Map

When should we expect a child to know the Principles of Counting?



If the response to the how many question is not an indication of children's understanding of counting, then what activities or tasks would give a true indication of their understanding?

Read, Write and Say Numbers

Name _____ Year/Grade _____ Date _____

Instructions: Write the numbers the teacher says. Here is an example.If the teacher says *nineteen* you write **19**.

1. _____ 4. _____

2. _____ 5. _____

3. _____ 6. _____

Write these numbers in words:

504

1 768

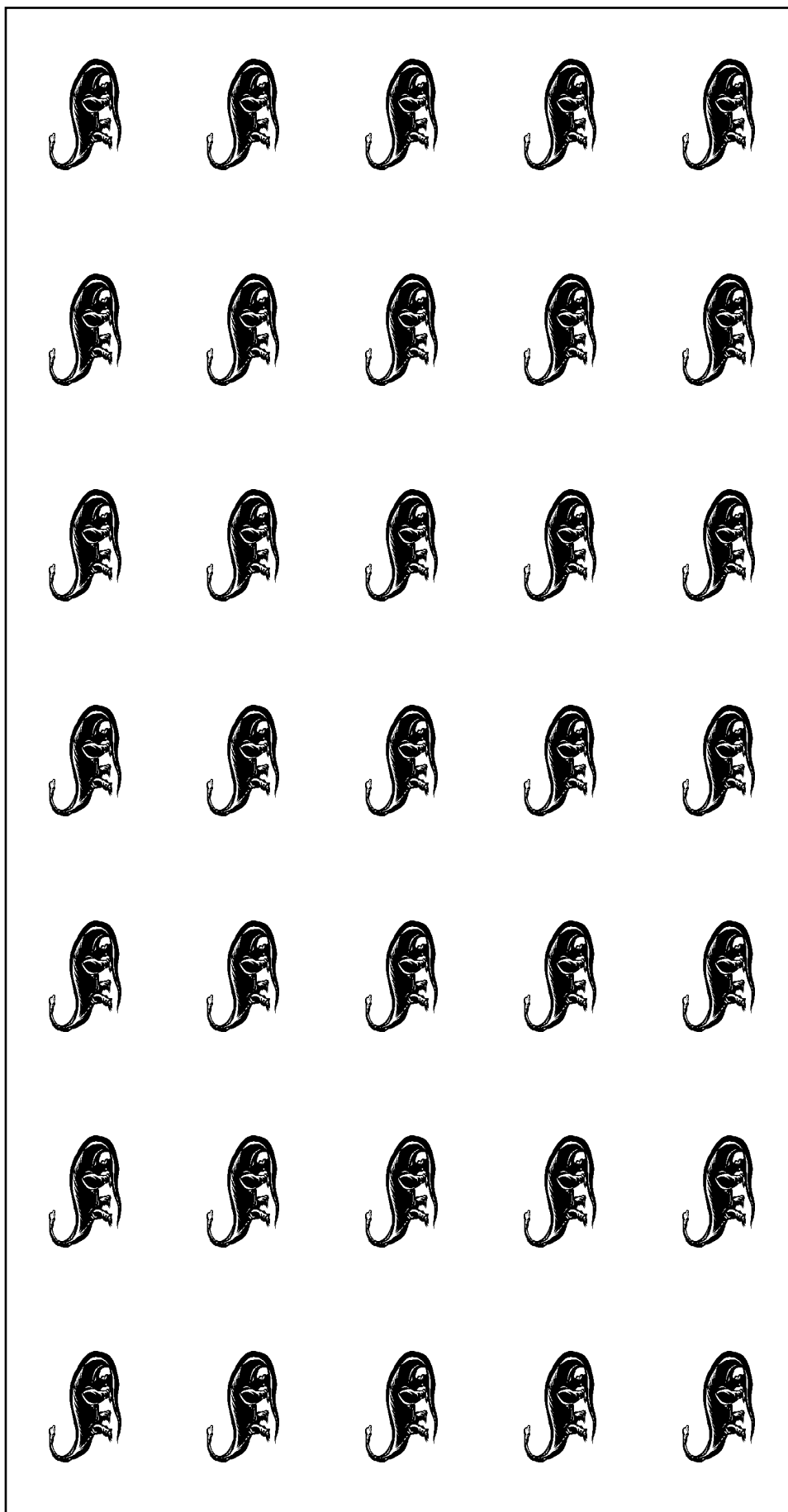
250 000

13 648

6 003

13 806 009

Name _____ Year/Grade _____ Date _____

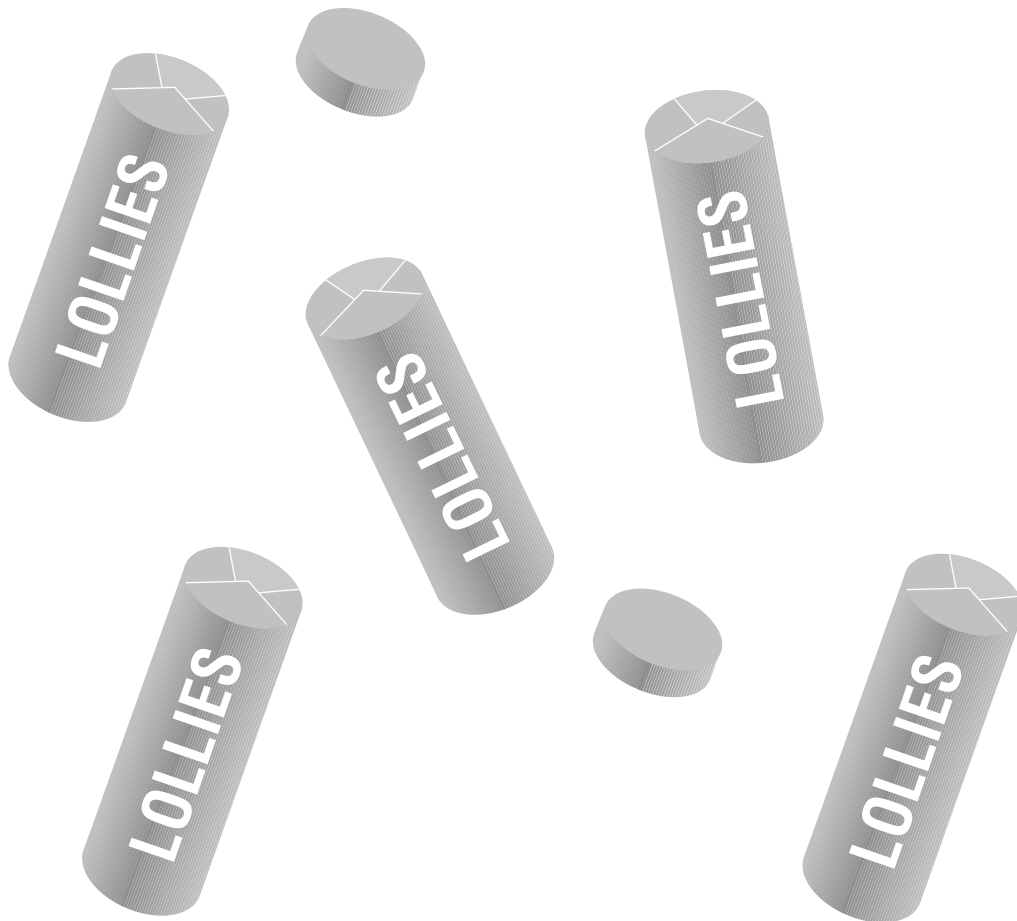


How many dinosaurs are here? _____

Lollies/Candies/Sweets

Name _____ Year/Grade _____ Date _____

Lollies can be bought as single lollies or in rolls of ten as shown here.



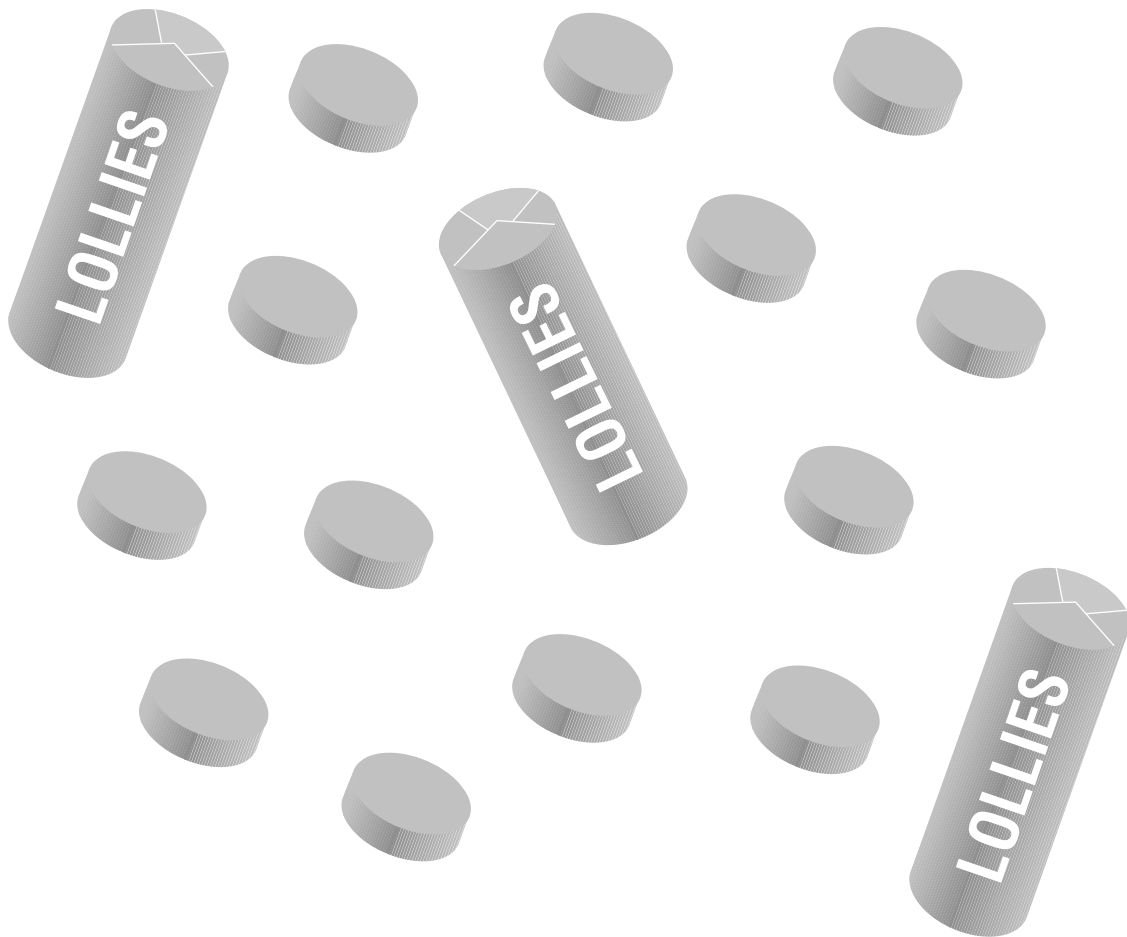
How many lollies are shown here? _____

Task based on Ross, S., 1989, Parts and Wholes and Place Value: A Developmental View,
Arithmetic Teacher, 36 (6), p 47–51

Lollies/Candies/Sweets

Name _____ Year/Grade _____ Date _____

Lollies can be bought as single lollies or in rolls of ten as shown here.



How many lollies are shown here? _____

Task based on Ross, S., 1989, Parts and Wholes and Place Value: A Developmental View,
Arithmetic Teacher, 36 (6), p 47–51

800 Game

You will need: 800 cards as shown, scissors and a calculator.

0	0	0	●	8
0	0	0	0	0

1. Cut out the cards so that each person has eight zeros, a decimal point and an eight.
2. Each person makes a number with their cards.
3. Decide how you could change the value of your eight so that it is equal to the value of your partner's eight.
4. Use a calculator to try out your suggestion.
5. Try some more examples.
6. Talk to other players. Are they doing it the same way as you?
How do you account for any differences?

0	0	0	0	8
0	0	0	●	0

Circle the Biggest

Name _____ Year/Grade _____ Date _____

1. Circle the biggest number:

37

370

How do you know it is bigger?

How many times bigger is it?

2. Circle the smallest number:

647

6470

How do you know it is smaller?

How many times smaller is it?

3. Circle the biggest number:

0.37

0.0037

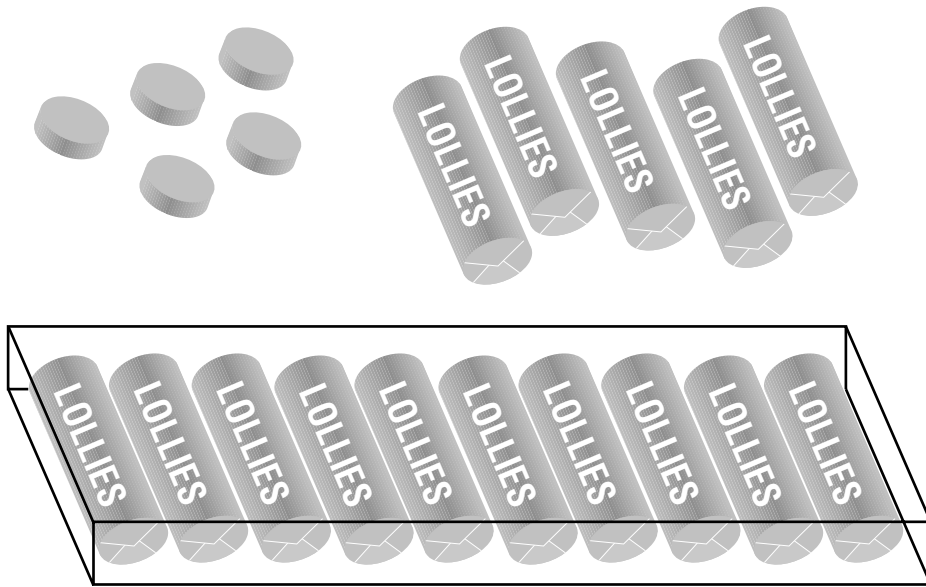
How do you know it is bigger?

How many times bigger is it?

116 Lollies/Candies/Sweets

Name _____ Year/Grade _____ Date _____

Lollies can be bought as single lollies, in rolls of ten or in boxes of 100 (like in the picture here).



How many different ways could you buy 116 lollies? Draw or write your answer.

Flexible Numbers

Name _____ Year/Grade _____ Date _____

Use the cards on the Flexible Numbers Cut Out Sheet to make each number in **as many ways as you can**. Record the different ways as you go. Put the cards back into a pile to use for the next number.

For example you can make up the number **532** using these cards from the card sheet.

5 hundreds

3 tens

2 ones


61

312

454

Flexible Numbers

Cut Out Sheet



14 ones	1 one	4 ones
2 ones	4 hundred	10 ones
11 ones	12 ones	3 tens
4 tens	5 tens	40 tens
41 tens	42 tens	1 ten
45 tens	6 tens	3 hundreds
31 tens	2 hundreds	11 tens

Name _____ Year/Grade _____ Date _____

Apples

What do you think this number means? **85•6**

Say how many apples you think you would have to give me if I asked for **85•6** apples?
Explain how you worked this out?

Explain how many apples you think you would have to give me if I asked for **2•19** apples?

Money

Jacob had to share \$33 among 8 people.

He used his calculator and pressed **$33 \div 8 =$** and this is what he saw
on his calculator: **4.125**

How much money should he give each person? _____

Explain how you decided.

How much money would be left over? _____



Name _____ Year/Grade _____ Date _____

Digit Values

Alan said the 2 in 0.203 means *2 tenths* but Kerry said the 2 also means *20 hundredths*, and Adrian said the 2 means *200 thousandths*. What do you think?

How could the 2 in 0.203 mean different fractions?

Number Sequence

Explain how you could use a calculator to generate this number sequence? (That is, if you enter 2 and then press some keys and then the = key you will get 0.2, and so on.)

2 0.2 0.02 0.002

Name _____ Year/Grade _____ Date _____

Decimal Numbers

Kevin, Yenchae and Marie looked on the board in the next classroom and saw:

0.5	0.05	0.50
-----	------	------

Those three numbers all mean exactly the same!

Kevin _____

No, they don't! Two of them mean the same amount, but the other one means something really different

Yenchae _____

I think you're both wrong, they all have to mean something different, they can't be the same amount!

Marie _____

Who do you think is right? (Tick which one)

Explain what the numbers mean and say how they are the same or different. (If you like you can use diagrams to help explain.)

0.5

0.05

0.50

Corey said 0.5 is $\frac{1}{2}$ (written as a simple or unit fraction).

So how would you write 0.05 as a simple (or unit) fraction?

What about 0.50? And 0.005?

Explain how you worked out these fractions.

From: Tomazos, D., 2002, *Knowing What They Know*, Department of Education, Western Australia, East Perth



How Many? 1

Name _____ Year/Grade _____ Date _____

Ellen had 4 tomatoes and then picked 3 more tomatoes from the garden.
How many does she have now?

How did you work it out?

At a party 5 children wanted red jelly beans and 8 wanted yellow jelly beans.
How many children want jelly beans?

How did you work it out?

The children needed lots of beanbags for a game. In one basket there were 13 beanbags.
In another basket there were 8 beanbags. How many beanbags did they have altogether?

How did you work it out?

How Many? 2

Name _____ Year/Grade _____ Date _____

There were 8 dogs playing and then 5 ran away. How many dogs are there now?

How did you work it out?

At a party some children wanted red jelly beans then 5 more wanted yellow jelly beans. Now 13 children want jelly beans. How many children want red jelly beans?

How did you work it out?

The children had 15 beanbags for a game. There were 6 green beanbags and the rest were red. How many beanbags were red?

How did you work it out?



How Many? 3

Name _____ Year/Grade _____ Date _____

Dirk has 5 bags of jelly beans with 3 jelly beans in each bag. How many jelly beans does he have all together? _____

How did you work it out?

Jesse has 12 bags of jelly beans with 5 jelly beans in each bag. How many jelly beans does he have all together? _____

How did you work it out?

How Many? 4

Name _____ Year/Grade _____ Date _____

Desiree has 12 Jelly Beans. She wants to put 3 Jelly Beans in each bag. How many bags would she need? _____

How did you work it out?

Tilopa has 12 lolly pops. She wants to share the lolly pops into 4 bags with the same number in each bag. How many lolly pops are in each bag? _____

How did you work it out?



Number Tiles Recording Sheet

Name _____ Year/Grade _____ Date _____

Put out the tiles **1, 3 and 9** and ask the child to add the numbers on the tiles.

Put out the tiles **6, 4 and 7** and ask the child to add the numbers on the tiles.

Put out the tiles **2, 10, 5 and 8** and ask the child to add them.

If the child is able to use the combinations to ten then continue with the next examples.

Put out all the tiles from **1–10** and ask the child to add all of the numbers.

Put out the tiles with **12, 14, 26 and 38** and ask the child to add all of the numbers.

Number Tiles

1	2	3	4
5	6	7	8
9	10	12	14
26	38		

Blocks in a Box Recording Sheet

Name _____ Year/Grade _____ Date _____

Part One

Using Blocks in a Box	Student's response
$1 + 1 = 2$	
$+ 2 = 4$	
$+ 1 = 5$	
$- 2 = 3$	
$- 1 = 2$	
$- 1 = 1$	
Start again	
$1 + 2 = 3$	
$- 1 = 2$	
$+ 2 = 4$	
$- 2 = 2$	
$+ 3 = 5$	
$- 2 = 3$	

Part Two

Without Materials	Student's response
What's one add two?	
What's two add two?	
What's four take two?	
What's two add three?	

Find the Solutions

Set A

Name _____ Year/Grade _____ Date _____

<p>On the bus there are 25 children from Mr Bender's class and 30 children from Mr Tubby's class. How many children are on the bus?</p>	<p>There were 100 paper clips in the box. We have used 37 of them. How many are left?</p>
<p>Mum made 24 pancakes in the first batch and 18 in the second batch. How many pancakes did she make?</p>	<p>Sean's family are on the way to town. They have already travelled 15 kilometres and town is 65 kilometres from their home. How far do they still need to travel to reach town?</p>
<p>There are 18 slices of bread in a loaf. How many slices will there be in 5 loaves?</p>	<p>There was \$120 in \$10 notes. How many notes should there be?</p>

Find the Solutions

Set B

Name _____ Year/Grade _____ Date _____

<p>In Joe's school each class has 25 children in it. The school has 16 classes. How many children in the school?</p>	<p>Crystal had 375 papers to deliver. She has delivered 127. How many does she still have to deliver?</p>
<p>Every week Ted earns \$235. Does he earn more or less than \$900 every 4 weeks? How do you know?</p>	<p>Jeremy has delivered 226 papers. How many more does he have to deliver until all of the 537 papers in his paper round are delivered?</p>
<p>Abi has two short paper rounds. She delivers 374 in one round and 227 in the other. How many papers does she deliver altogether?</p>	<p>There were 1035 papers to deliver and 10 delivery people? How many papers do they each deliver?</p>

Find the Solutions

Set C

Name _____ Year/Grade _____ Date _____

15 x 16	25 + 30
375 – 124	24 + 18
226 + _____ = 537	18 X 5
374 + 227	100 – 37
235 X 4 Estimate, is this more or less than 900? Why?	15 + _____ = 65
1035 splits into groups of 10	120 splits into groups of 10
27 X 16	

Kangaroos

Name _____ Year/Grade _____ Date _____

There were 3 kangaroos drinking at a river. 2 more kangaroos came to drink at the river. How many kangaroos are drinking at the river?

Sann had 9 biscuits and then gave his brother 5 of them. How many biscuits does he have now?

There were 9 rabbits and 7 pieces of carrot. Are there enough carrots for all of the rabbits? How many rabbits miss out?



Comparing Bananas

Name _____ Year/Grade _____ Date _____

Dan had 8 bananas. Tracy had 3 more than Dan. How many bananas did Tracy have?

Fran had 7 smarties. Tom gave her some more. Now she has 19. How many did Tom give Fran?

Gloria went shopping. She spent \$16 and when she arrived home she had \$18 left. How much money did she have to start with?



How Much Taller?

Name _____ Year/Grade _____ Date _____

Jesse and Sylvia were chatting on the net. Jesse said that she was 154 centimetres tall and Sylvia said she was 132 centimetres. Jesse said, 'I am taller than you.' Sylvia said, 'Yes, but not by much.'

How much taller is Jesse than Sylvia? _____

Explain how you worked out the answer.

Write a number sentence that you could use in a calculator to work it out.

Empty Boxes

Name _____ Year/Grade _____ Date _____

What numbers and symbols would you use on the calculator to solve the following problems?

$17 + \square = 36$ _____

$\square - 27 = 34$ _____

$35 = \square + 16$ _____

$43 - \square = 16$ _____

$468 + \square = 842$ _____

$283 = 674 - \square$ _____

$\square - 15.78 = 12.43$ _____

Change Task 1

Name _____ Year/Grade _____ Date _____

Write the numbers and signs that you would use to solve each with a calculator. You do not have to solve them.

Anna had 7 cards and then her brother gave her 3. How many does she now have?

Anna had 6 jellybeans but would like to have 11. How many more does she need to get?

Anna had some marbles and then her brother gave her 4. Now she has 10. How many did she have to start with?

Anna had 12 cards and then she gave her brother 3. How many does she now have?

Anna had 13 jellybeans and then she gave her brother some. She now has 7. How many did she give her brother?

Anna had some lollies and gave her brother 3 of them. Now she has 8 left. How many did she have to start with?



Change Task 2

Name _____ Year/Grade _____ Date _____

Write the numbers and signs that you would use to solve each with a calculator. You do not have to solve them.

Anna has 112 techno-swap cards and some champion swap cards. She has 87 more champion swap cards than techno-swap cards. How many champion cards does she have?

In the long jump final at the Sydney Olympics, the Canadian athlete jumped 8.55 metres, and the Australian athlete jumped 7.67 metres. How much further did the Canadian athlete jump than the Australian athlete?

Anna has 156 pearly marbles and some cats-eye marbles. She has 89 fewer cats-eye marbles. How many cats-eye marbles does Anna have?

The school had 307 books and 254 bookmarks. If one bookmark is put into each book, how many books won't have a bookmark?

Anna has 145 white bears and some brown bears. All the white bears took a brown bear as a partner, and there were 78 brown bears left without a partner. How many brown bears does she have?

At the sports day Sonya jumped 3.25 metres. If Mark jumped another 0.87 metres his jump would have been the same as Sonya's. How long was Mark's jump?



Story Problems 1

Name _____ Year/Grade _____ Date _____

Work out the answer to each story problem. Show how you worked it out.

The emu farmer wants to separate his 24 emus into small paddocks. He wants to put 6 emus in each paddock. How many paddocks does he need?

Dad said, "We're having visitors for a barbecue tea. That means there will be 9 people. We'll have 3 sausages each." Dad sent the children to the butchers to buy the sausages. How many sausages would they have to ask the butcher for?

Mrs Beattie wanted to put her 24 cows into 6 paddocks. How many cows should she put in each paddock if she wants the same number of cows in each paddock?

Story Problems 2

Name _____ Year/Grade _____ Date _____

Work out the answer to each story problem. Show how you worked it out.

Katie went to the deli. There were 4 icecream flavours – strawberry, vanilla, chocolate and bubblegum. There were three types of cones- chocolate, vanilla and waffle. How many choices of single icecreams did Katie have?

Sam has three tennis balls. Hanna has 5 times as many balls as Sam. How many balls does Hanna have?

Your class is planning a vegetable garden. Thomas said, "Let's plant 5 pea seeds in each row." Georgia said, "Lets plant 4 rows" How many pea seeds would be planted?

Calculator Number Sentences

Name _____ Year/Grade _____ Date _____

What would you key into your calculator to solve these problems?

<p>The burger place had a special \$18 Family Feast Deal. It was packed with people. There were about 6 people at each table and there were about 36 tables. About how many people were there?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>A bulk box of lolly snakes costs \$5.40. There were 216 snakes in the box. If there were 27 students in the class and the snakes were given out, how many snakes would each child get?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>The year 6's were selling cup cakes to raise funds for the school camp. The cakes cost \$4.80 a box. The canteen had cooked 400 cakes and needed to put them into boxes of 8. How many boxes would they need?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>
<p>Helen likes to ride 20 kilometres every day. She rides at an average speed of 5 kilometres per hour. How far does she ride in 3 hours?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>Jeremy picked 6 bags of apricots. If a 3 kilo bag costs \$12.60, what is the price per kilo?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>Apricots cost \$4.30 a kilo. If a sack of apricots cost \$12.60 how much must it weigh?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>
<p>Every week at B.M.X. each age group has 4 races. There were 6 times as many boys racing as girls. There were 18 girls and 36 parents. How many boys were there?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>A picture, which has been enlarged three times its original size, is now 180 mm high. What was its original height?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>There were 15 kids at the barbecue. One of the older kids hid some prizes. Simon found 30 prizes and his sister Sharn found 5. How many times more prizes did Simon find than Sharn?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>
<p>John needed \$2.00 to go to the T Ball disco. He had 4 pairs of shorts and 5 tops. How many outfits could he choose from</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>Sarah was planting corn. The seeds cost \$2.50 a packet. She had 75 seeds and wanted to plant 15 rows. How many seeds in each row?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>A rectangle of area of 208 sq metres has one side 16 metres long. How long is the adjacent side?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>

Finding Factors

Name _____ Year/Grade _____ Date _____

Find factors for these numbers

81 _____

Which numbers did you try? _____

Which ones were hardest to find? _____

How did you work it out? _____

105 _____

Which numbers did you try? _____

Which ones were hardest to find? _____

How did you work it out? _____

Sam wondered if 13 was a factor of 105 but did not know what to put into the calculator to find out. Explain to Sam what he could do to find out.

Whole School Curriculum Planner: Number Overview Pt 1

Understand Number Part A	B	M	L	Understand Operations	B	M	L	Calculate	B	M	L
1. We can count a collection to find how many are in it				1. Adding and subtracting numbers are useful where we: <ul style="list-style-type: none"> change a quantity by adding more or taking some away; think of a quantity as combined of parts; or equalise or compare two quantities 				1. The same number fact will be true no matter how you count the objects or what the objects are			
2. We can often see how many are in a collection just by looking and also by thinking of it in parts				2. Partitioning numbers into part-part-whole helps us relate addition and subtraction and understand their properties				2. We can think of a number as a sum or difference in different ways. We can rearrange the factors of an addition without changing the quantity			
3. We can use numbers in ways which do not refer to quantity				3. Multiplying numbers is useful where we: <ul style="list-style-type: none"> repeat equal quantities; use rates; make ratio comparisons or changes (eg scales); make arrays and combinations; and need products of measures 				3. We can think of a number as a multiplication or division in different ways. We can rearrange the parts of a multiplication without changing the quantity			
4. The whole numbers are in a particular order and there are patterns in the way we say them which help us to remember the order				4. Dividing numbers is useful where we: <ul style="list-style-type: none"> share/group a quantity into a given number of portions; share/group a quantity into portions of a given size; or need the inverse of multiplication 				4. Place value and basic number facts together allow us to calculate with any whole or decimal numbers			
5. There are patterns in the way we write whole numbers which help us to remember their order				5. Repeating equal quantities and partitioning a quantity into equal parts helps us relate multiplication and division and understand their properties				5. There are strategies which we can practise to help us do calculations in our head			
6. Place value helps us to think of the same whole number in different ways and this can be useful.				6. The same operation can be said and written in different ways				6. There are some special calculating methods that we can use for calculations we find hard to do in our head			
7. We can extend the patterns in the way we write the whole numbers to write decimals				7. Properties of operations and relationships between them can help us to decide whether number sentences are true.				7. We can calculate with fractions. Sometimes renaming fractions is helpful for this			
8. We can compare and order the numbers themselves				8. Thinking of a problem as a number sentence often helps us to solve it. Sometimes we need to re-write the number sentence in a different but equivalent way				8. Rounding, imagining a number line, and using properties of numbers and operations help us to estimate calculations			
				9. We make assumptions when using operations. We should check that the assumptions make sense for the problem.				9. To use a calculator well you need to enter and interpret the information correctly and know about its functions			
								10. Thinking about what makes sense helps us to check and interpret the results of calculations			

Whole School Curriculum Planner: Number Overview Pt 2

Understand Number Part B Fractions	B	M	L	Reason About Number Pattern	B	M	L
1. When we split something into two equal sized parts we say we have halved it and that each part is half the original thing				1. We use regularity or pattern to infer one thing from another thing and to make predictions			
2. We can partition objects and collections into two or more equal sized parts and the partitioning can be done in different ways				2. Representing aspects of a situation with numbers can make it easier to see patterns in the situation			
3. We use fraction words and symbols to describe parts of a whole. The whole can be an object, a collection or a quantity				3. To describe a number pattern means to provide a precise rule which produces the pattern			
4. The same fractional quantity can be represented with a lot of different fractions. We say fractions are equivalent when they represent the same number or quantity				4. There are strategies which help us become better at recognising common types of patterns			
5. We can compare and order fractional numbers and place them on a number line				5. Our numeration system has a lot of specially built-in patterns which make working with numbers easier			
6. A fractional number can be written as a division or as a decimal				6. Some numbers have interesting or useful properties. Investigating the patterns in these special numbers can help us to understand them better			
7. A fraction symbol may show a ratio relationship between two quantities. Percentages are a special kind of ratio we use to make comparisons easier							

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